

CLAIMS

1. A method for initializing a material (variable-resistance material) whose resistance value increases/decreases according to the polarity of an applied electric pulse, wherein an
5 electric pulse having a first polarity is applied at least once between first and second electrodes connected to the variable-resistance material such that the potential of the first electrode is higher than that of the second electrode.
2. The method of claim 1, wherein the first electric pulse is repeatedly applied between the
10 first and second electrodes till the variation rate of the resistance value of the variable-resistance material becomes smaller than a predetermined value.
3. The method of claim 2, wherein after the first electric pulse is repeatedly applied
15 between the first and second electrodes till the variation rate of the resistance value of the variable-resistance material becomes smaller than a predetermined value, an electric pulse having a second polarity is applied at least once between first and second electrodes connected to the variable-resistance material such that the potential of the first electrode is lower than that of the second electrode.
- 20 4. The method of claim 3, wherein the second electric pulse is repeatedly applied between the first and second electrodes till the variation rate of the resistance value of the variable-resistance material becomes smaller than a predetermined value.
- 25 5. A memory device formed using a material (variable-resistance material) whose resistance value increases/decreases according to the polarity of an applied electric pulse, comprising:
a variable-resistance material to which first and second electrodes are

connected; and

a fixed resistor, one end of which is connected to the first or second electrode,

wherein an electric pulse is applied for recording between the first and
5 second electrodes.

6. The memory device of claim 5, wherein memory information is read based on a voltage between the first and second electrodes which is obtained when a predetermined voltage is applied between one of the first and second electrodes which is not connected to the one
10 end of the fixed resistor and the other end of the fixed resistor.

7. The memory device of claim 5, wherein memory information is read based on a voltage between the ends of the fixed resistor which is obtained when a predetermined voltage is applied between one of the first and second electrodes which is not connected to the one
15 end of the fixed resistor and the other end of the fixed resistor.

8. The memory device of claim 5, wherein the variable-resistance material is initialized in advance by the initialization method recited in any one of claims 1 to 4.

20 9. A method for initializing a memory circuit,
the memory circuit including first and second variable resistors connected in series between a first terminal and a second terminal,

the first variable resistor being connected between the first terminal and a third terminal and having a resistance value which increases/decreases according to the
25 polarity of a pulse voltage applied between the first terminal and the third terminal, and

the second variable resistor being connected between the third terminal and the second terminal and having a resistance value which increases/decreases according

to the polarity of a pulse voltage applied between the third terminal and the second terminal,

the initialization method comprising the steps of:

(a) in an initial state where the first and second variable resistors have not yet been subjected to application of a pulse voltage, applying a first pulse voltage having a first polarity between the first terminal and the third terminal at least once and applying a second pulse voltage having a second polarity between the third terminal and the second terminal at least once; and

(b) after the application of the pulse voltages at step (a), applying a third pulse voltage having a polarity opposite to that of the pulse voltage applied at step (a) at least once to any one of a portion between the first terminal and the third terminal and a portion between the third terminal and the second terminal.

10. The method of claim 9, wherein the polarities of the first and second pulse voltages applied at step (a) are such that the potential of the first terminal becomes higher than the potential of the third terminal and the potential of the third terminal becomes higher than the potential of the second terminal or such that the potential of the first terminal becomes lower than the potential of the third terminal and the potential of the third terminal becomes lower than the potential of the second terminal.

11. The method of claim 9, wherein the polarities of the first and second pulse voltages applied at step (a) are such that the potential of the first terminal becomes higher than the potential of the third terminal and the potential of the second terminal becomes higher than the potential of the third terminal or such that the potential of the first terminal becomes lower than the potential of the third terminal and the potential of the second terminal becomes lower than the potential of the third terminal.